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People's Conceptions of Intelligence

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Three experiments are reported investigating experts' and laypersons' conceptions of intelligence. In the first experiment, persons studying in a college library, entering a supermarket, and waiting for trains in a railroad station were asked to list behaviors characteristic of either "intelligence," "academic intelligence," "everyday intelligence," or "unintelligence," and to rate themselves on each of the three kinds of intelligence. In the second experiment, experts and laypersons (excluding students) were asked to

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rate various properties of the behaviors listed in Experiment 1; the laypersons also rated themselves on the three kinds of intelligence and took an IQ test. In the third experiment, laypersons received written descriptions of behaviors characterizing fictitious people, and were asked to rate these people's intelligence. We found that people have well-formed prototypes corresponding to the various kinds of intelligence, that these prototypes are quite similar for experts and laypersons, that the prototypes are closely related to certain psychological theories of intelligence, and that the prototypes are used in the evaluation of one's own and others' intelligence. Moreover, proximity of one's behavioral self-characterization to an ideal prototype is quite strongly related to intelligence as measured by an IQ test.

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Abstract

Three experiments are reported investigating experts' and laypersons' conceptions of intelligence. In the first experiment, persons studying in a college library, entering a supermarket, and waiting for trains in a railroad station were asked to list behaviors characteristic of either "intelligence," "academic intelligence," "everyday intelligence," or "unintelligence," and to rate themselves on each of the three kinds of intelligence. In the second experiment, experts and laypersons (excluding students) were asked to rate various properties of the behaviors listed in Experiment 1; the laypersons also rated themselves on the three kinds of intelligence and took an IQ test. In the third experiment, laypersons received written descriptions of behaviors characterizing fictitious people, and were asked to rate these people's intelligence. We found that people have well-formed prototypes corresponding to the various kinds of intelligence, that these prototypes are quite similar for experts and laypersons, that the prototypes are closely related to certain psychological theories of intelligence, and that the prototypes are used in the evaluation of one's own and others' intelligence. Moreover, proximity of one's behavioral self-characterizations to an ideal prototype is quite strongly related to intelligence as measured by an IQ test.

People's Conceptions of Intelligence

Because of its importance in the everyday world as well as in psychological theorizing and measurement, intelligence has been a heavily researched psychological construct during most of the present century. Research on intelligence could be broadly classified as being of two types, depending upon the nature of the theory motivating the research.

Most research on intelligence has been devoted to the construction and testing of what might be referred to as "explicit theories" of intelligence: Explicit theories are constructions of psychologists or other scientists that are based or at least tested on data collected from people performing tasks presumed to measure intelligent functioning. For example, a battery of mental ability tests might be administered to a large group of people and the data from these tests analyzed in order to isolate the proposed sources of intelligent behavior in test performance. Although investigators working with explicit theories of intelligence might disagree as to the nature of these sources of intelligence--which might be proposed to be factors, components, schemata, or some other kind of psychological construct--they would agree that the data base from which the proposed constructs should be isolated should consist (directly or indirectly) of performance on tasks requiring intelligent functioning.

A less sizable research effort has been devoted to the discovery of what might be referred to as "implicit theories" of intelligence: Implicit theories are constructions of people (psychologists or laypersons) that reside in the minds of these individuals. Such theories need to be "discovered" rather than "invented" because they already exist, in some form, in people's heads. The goal in research on implicit theories of intelligence is to find out the form and content of people's informal theories. Thus, one attempts

to reconstruct already existing theories, rather than to construct new theories. The data of interest are people's communications (in whatever form) regarding their notions as to the nature of intelligence. For example, a survey of questions regarding the nature of intelligence might be administered to a large group of people and the data from this survey analyzed in order to reconstruct people's belief systems. Although investigators working with implicit theories of intelligence might disagree as to the nature of people's beliefs, they would agree that the data base from which the proposed constructs should be isolated should consist of people's stated or exercised beliefs regarding intelligent functioning.

We believe both explicit and implicit theories of intelligence should be of interest to psychologists. Explicit theories are interesting because the importance of intelligence to psychological theory and measurement, as well as to society, make it worthwhile to know insofar as we are able what intelligence is; because these theories can serve as the basis for the systematic and rational assessment, and eventually; training of intelligence; and because these theories can suggest where people's conceptions are adequate and where they are inadequate, and thereby help shape these conceptions. Implicit theories are interesting because the importance of intelligence in our society makes it worthwhile to know what people mean by intelligence; because these theories do in fact serve as the basis of informal, everyday assessment (as in college or job interviews) and training (as in parent-child interactions) of intelligence; and because these theories may suggest aspects of intelligent behavior that need to be understood but are overlooked in available explicit theories of intelligence.

We believe the importance of implicit theories of intelligence has been

underplayed in psychological research. Most of the assessment and training of intelligence that transpire in the real world are based upon implicit rather than explicit theories of intelligence. For example, many more assessments of other people's intellectual abilities are made in the course of interviews and even everyday social interactions (such as cocktail parties, conversations at coffee breaks, and the like) than are made in the evaluations of scores from intelligence tests. Moreover, people (even psychologists!) seem ultimately to trust measurements made on the basis of their implicit theories more than they trust measurements made on the basis of explicit theories. Psychologists conduct interviews all of the time, despite the notorious low validity and reliability of interview assessments; and psychologists as well as others seem to believe in the outcomes of these interviews. We have much more often seen people expressing astonishment at mental test scores that are inconsistent with the people's informal assessments of the interviewee's intellectual capabilities than we have people expressing astonishment at their own poor judgment after finding out that the mental test scores were inconsistent with their personal assessments.

The remainder of this article will deal with people's conceptions, or implicit theories, of intelligence, although attempts will be made to interrelate these implicit theories to explicit ones, and to compare people's subjective judgments with measurements from "objective" tests. We shall be concerned not only with what people's conceptions are, but with how people use these conceptions in assessing the intelligence of others on the basis of descriptions of these others' behavioral tendencies.

One question that needs to be answered in the proposed approach to intelligence is that of whose notions are to serve as the data base of interest. The main groups that have been studied so far are experts in the field of intelligence, adult laypersons, children, and individuals (usually adults) from other cultures.

Most often, the "subjects" in this approach have been "experts" on intelligence. The most well-known example of the approach is probably a symposium that appeared almost 60 years ago in the Journal of Educational Psychology ("Intelligence and its Measurement," 1921). Fourteen experts gave their views on the nature of intelligence, with definitions such as the power of good responses from the point of view of truth or fact (E. L. Thorndike), the ability to carry on abstract thinking (L. M. Terman), and the ability to adapt oneself adequately to relatively new situations in life (R. Pintner).

Viewed narrowly, there seem to be as many definitions of intelligence as there were experts asked to define intelligence. Viewed broadly, however, two themes seem to run through at least several of the definitions in the complete set: the capacity to learn from experience and the capacity to adapt to one's environment. These themes run through definitions of more recent experts as well. Ferguson (1954) has viewed intelligence primarily in terms of the ability to transfer training, and Piaget (1972) has defined intelligence largely in terms of one's adaptation to the environment in which one finds oneself.

Some psychologists have argued that laypersons should form at least one population to be studied in research on people's conceptions of intelligence. A leading proponent of this point of view is Neisser (1979), who is largely responsible for reawakening modern interest in people's conceptions

of intelligence. According to Neisser (1979),

> "intelligent person" is a prototype-organized Roschian concept. Our confidence that a person deserves to be called "intelligent" depends on that person's overall similarity to an imagined prototype, just as our confidence that some object is to be called "chair" depends on its similarity to prototypical chairs. There are no definitive criteria of intelligence, just as there are none for chairness; it is a fuzzy-edged concept to which many features are relevant. Two people may both be quite intelligent and yet have very few traits in common--they resemble the prototype along different dimensions. Thus, there is no such quality as intelligence, any more than there is such a thing as chairness--resemblance is an external fact and not an internal essence. There can be no process-based definition of intelligence, because it is not a unitary quality. It is a resemblance between two individuals, one real and the other prototypical. (p. 185)

Neisser has noted that he is not the first to express such a view, which he has traced back at least to E. L. Thorndike (1924):

> For a first approximation, let intellect be defined as that quality of mind (or brain or behavior if one prefers) in respect to which Aristotle, Plato, Thucydides, and the like, differed most from Athenian idiots of their day, or in respect to which the lawyers, physicians, scientists, scholars, and editors of reputed greatest ability at constant age, say a dozen of each, differ most from idiots of that age in asylums. (p. 126)

Neisser has suggested that tests such as the Stanford-Binet have been reasonably successful because they consist of large numbers of items that assess resemblance to different aspects of the prototype. Individual items function like individual dimensions of a chair in the construction of a prototype.

Neisser (1979) has collected informal data from Cornell undergraduates regarding their conceptions of what intelligence is. More formal studies have

been conducted by Cantor (Note 1), who asked adult subjects to list attributes of a "bright" person, and by Bruner, Shapiro, and Tagiuri (1958), who asked people how often "intelligent" people also display other personality traits. These authors found, for example, that intelligent people are likely to be characterized as clever, deliberate, efficient, and energetic, but not as apathetic, unreliable, dishonest, and dependent.

Siegler and Richards (in press) asked adult subjects to characterize intelligence as it applies to children of different ages. They found a trend toward people conceiving of intelligence as less perceptual-motor and as more cognitive with increasing age. Yussen and Kane (in press) asked children in the first, third, and sixth grades what their conceptions of intelligence are. They found that older children's conceptions were more differentiated than were younger children's; that with increasing age, children increasingly characterized intelligence as an internalized quality; that older children were less likely than younger ones to think that overt signs signal intelligence, and that older children were less global in the qualities they associated with intelligence than were younger children.

Wober (1974) investigated conceptions of intelligence among members of different tribes in Uganda, as well as within different subgroups of the tribes. Wober found differences in conceptions of intelligence both between and within tribes. The Baganda, for example, tended to associate intelligence with mental order, whereas the Batoro associated it with some degree of mental turmoil. In terms of semantic-differential scales, Baganda tribespeople thought of intelligence as persistent, hard, and obdurate, whereas Batoro thought of it as soft, obedient, and yielding.

We performed three experiments investigating American adults' conceptions of intelligence. In the first, people in a train station, entering a supermarket, and studying in a college library were asked to list behaviors characteristics of either "intelligence," "academic intelligence," "everyday intelligence," or "unintelligence," and to rate their own intelligence, academic intelligence, and everyday intelligence. In the second experiment, both laypersons answering a newspaper advertisement and experts answering a mail survey were asked to provide various kinds of ratings of the behaviors obtained in the first experiment; the laypersons also rated their own intelligence, academic intelligence, and everyday intelligence. In the third experiment, laypersons selected at random from a New Haven area phone book were asked to rate the intelligence of various fictitious people who were characterized in terms of different mixes of the behaviors listed by subjects in the first experiment.

EXPERIMENT 1

In this experiment, we set out to compile a master list of intelligent and unintelligent behaviors, and to ascertain various characteristics of these behaviors and their relations to the people who supplied them.

Method

Subjects

This experiment involved 186 subjects in all, including 61 people studying in a college library at Yale, 63 people waiting for trains in the New Haven train station during morning and afternoon rush hours, and 62 people entering a local supermarket.

Materials

Subjects received a blank page on which to list behaviors characteristic of "intelligence," "academic intelligence," "everyday intelligence," or "unin-

telligence," and a page on which to rate themselves (on a 1=low to 9=high scale) on intelligence, academic intelligence, and everyday intelligence.

<u>Design</u>

Subjects listed behaviors characteristic of just one of the four investigated attributes, but rated themselves on each of three attributes.

<u>Procedure</u>

People were approached by one of four experimenters (two males, two females) in each of the locales and were asked to give five minutes of their time to the experiment. They listed characteristic behaviors first, and then rated themselves on the three scales.

<u>Results</u>

<u>Compilation of Master List of Behaviors</u>

Behaviors listed by the subjects were compiled into a master list of behaviors. Behaviors were included if they were listed even just once, although obvious redundancies were eliminated. The final list consisted of 250 behaviors, of which 170 were for the various kinds of intelligence ("intelligence," "academic intelligence," "everyday intelligence") and 80 were for unintelligence.

<u>Correlations of Frequencies of Listed Behaviors</u>

Table 1 shows the correlations between the frequencies with which each of the 170 intelligent behaviors was listed by subjects in each setting for each type of intelligence. Since responses were summed over subjects, these data can be interpreted for the three subgroups, but not at the level of individual respondents. In the library setting, frequencies of listed behaviors were significantly correlated for intelligence and academic intelligence but not for intelligence and everyday intelligence; in the railroad and supermarket settings, the opposite pattern of results obtained: correlations between frequencies were significant for intelligence and everyday intelligence, but not for intelligence and academic intelligence. Judging

by the frequencies of behaviors listed for each type of intelligence, then, we conclude that the denizens of the college library (mostly Yale undergraduates) perceived "intelligence" as being substantially similar to "academic intelligence" but not to "everyday intelligence." People in the railroad station (mostly commuters) and supermarket (mostly housewives and school teachers) perceived "intelligence" as being substantially similar to "everyday intelligence" but not to "academic intelligence."

Insert Table 1 about here

Correlations of Self-Ratings

Table 2 shows the correlations between the self-ratings of subjects in each setting for each type of intelligence. In the library setting, self-ratings of intelligence were very highly correlated with self-ratings of academic intelligence, but only moderately correlated with self-ratings of everyday intelligence, with the first correlation significantly higher than the second. Self-ratings of academic and everyday intelligence were weakly, although significantly, correlated. In the railroad setting , the correlations between intelligence on the one hand, and both academic and everyday intelligence on the other, were high and practically identical. The correlation between intelligence and everyday intelligence was significantly higher in this group than it was in the library group. In the supermarket setting, the pattern of results was intermediate between those of the other two groups: Self-ratings of intelligence provided by the subjects were significantly more highly correlated with self-ratings of academic intelligence than with self-ratings of everyday intelligence, but the correlation of intelligence with everyday intelligence, and of academic intelligence with everyday intelligence, was intermediate between those of the other two groups. Note that the overall pattern of results rather closely reflects

those of the supermarket group, but does not reflect the variation in the groups constituting the sample as a whole.

Insert Table 2 about here

Multiple correlations were computed between ratings of intelligence on the one hand, and of academic and everyday intelligence on the other. The multiple correlations were .83 in the library group, .81 in the railroad group, and .87 in the supermarket group. The beta coefficients closely resembled the simple correlations in pattern: Academic intelligence received higher weights than everyday intelligence in the library and supermarket groups; everyday intelligence received a slightly higher weight than academic intelligence in the railroad group. The overall multiple correlation for the groups combined was .83.

Conclusions

People appear to have organized conceptions of intelligent behavior, but if intelligence is to be understood in terms of prototypes (Neisser, 1979), then the results of this experiment suggest that there may be more than one prototype. In particular, people seem to have at least somewhat different conceptions of the meanings of "intelligence," "academic intelligence," and "everyday intelligence," and these conceptions may differ across populations of subjects. The students and the railroad commuters seemed to represent two extremes, with the supermarket patrons falling in-between. The underlying continuum seemed to be one in which people differ with respect to their relative weights on academic versus everyday aspects of intelligent behavior in understanding overall intelligence. The second experiment was intended to elucidate the structure and content of people's conceptions.

EXPERIMENT 2

In this experiment, we sought to ascertain what experts and laypersons think intelligence is, and to compare their respective views. We also wished to discover the degrees of correspondence among measured IQ, self-rated intelligence, and self-rated descriptions of one's own behavior.

Method

Subjects

There were two principal groups of subjects in this experiment. The first group comprised 122 laypersons from the New Haven area answering one of several advertisements in local newspapers. Because the results of the first experiment suggested that students' conceptions of intelligence can differ substantially from nonstudents' conceptions, and because our primary interest was in the general population, students were excluded from participation. The second group comprised 140 experts in the field of intelligence. All experts were psychologists with doctoral degrees doing research on intelligence in major university and research centers around the country. They answered a questionnaire sent to them by mail. The return rate on the questionnaire was 48%.

Materials

Materials for the experiment consisted of a list of 250 behaviors compiled from Experiment 1, with different questions asked about these behaviors of different groups (described below); a page on which laypersons could rate themselves using a percentile scale on intelligence, academic intelligence, and everyday intelligence; and, again, for laypersons only, the adult-level scale of the Henmon-Nelson Test of Mental Abilities, an omnibus intelligence test of demonstrated high validity and reliability.

<u>Design</u>

There were four different questionnaire groups. All four questionnaires were distributed to laypersons; only the first two questionnaires were distributed to experts. No single person received more than one questionnaire. All items required ratings on a 1 (low) to 9 (high) rating scale.

1. <u>Importance ratings</u>: <u>Ideal person</u>. In Questionnaire 1, subjects (75 experts and 30 laypersons) were asked to rate how important each of the 170 behaviors associated with intelligent (as opposed to unintelligent) functioning was in defining their conception of an "ideally" (a) intelligent person, (b) academically intelligent person, and (c) everyday intelligent person. The "ideal" was described as the best possible on a given dimension, but no further information was given.

2. <u>Characteristicness ratings</u>: <u>Ideal person</u>. In Questionnaire 2, subjects (65 experts and 28 laypersons) were asked to rate how characteristic each of 250 behaviors was of an "ideally" (a) intelligent person, (b) academically intelligent person, and (c) everyday intelligent person. Subjects were again told to form their own image of the "ideal."

3. <u>Characteristicness ratings</u>: <u>Trait</u>. In Questionnaire 3, subjects (28 laypersons) were asked to rate how characteristic each of 250 behaviors was of their "ideal" concept of (a) intelligence, (b) academic intelligence, and (c) everyday intelligence.

4. <u>Characteristicness ratings</u>: <u>Self and other</u>. In Questionnaire 4, subjects (35 laypersons) were asked to rate how characteristic each of 250 behaviors was of (a) themselves and (b) that other adult whom they knew best.

To summarize, Questionnaire 1 dealt with ratings of the importance of behaviors in defining an ideally intelligent person; Questionnaire 2 dealt with ratings of the characteristicness of behaviors in an ideally intelligent person; Questionnaire 3 dealt with ratings of the characteristicness of the behaviors in an ideal of each term as a trait; Questionnaire 4 dealt with ratings of characteristicness of behaviors in oneself and in the other adult one knows best.

The order in which ratings were made on each of the 1=low to 9=high questionnaire scales was counterbalanced across subjects. For example, one subject might rate each behavior first for intelligence, then for academic intelligence, and then for everyday intelligence, whereas another subject might rate each behavior first for academic intelligence, then for everyday intelligence, and then for intelligence.

<u>Procedure</u>

Laypersons filled out their questionnaire, self-rating, and IQ-test materials in experimental testing rooms at Yale. Experts filled out their questionnaire materials at their own institutions and sent back their forms by return mail. For the laypersons, the questionnaires were always administered first, followed by self-ratings, and then the IQ test.

Results

<u>Relations within and between Ratings of Experts and Laypersons</u>

Table 3 shows correlations within and between ratings of experts and laypersons. Correlations are between subject means on each questionnaire item. For example, Correlation 1-4 is between experts' and laypersons' questionnaire response patterns for the attribute, <u>intelligence</u>. These correlations address several questions of interest. Since the reliabilities of the data upon which they are based are generally in the high .90s, it is possible to take the correlations at face value without concerns about attenuation due to unreliability.

Insert Table 3 about here

First, it is apparent that experts view intelligence as very closely related behaviorally to both academic and everyday intelligence; laypersons view them as less closely related, especially in terms of the importance of the behaviors to defining ideal persons. Experts see academic and everyday intelligence as less closely related than is intelligence to each of academic and everyday intelligence, but again, the laypersons see an

even weaker relationship. Clearly, both experts and laypersons distinguish between behaviors associated with academic intelligence and ones associated with everyday intelligence.

Second, ratings of importance and of characteristicness show generally similar trends, and were, in fact, highly correlated. Among the experts, correlations between the two kinds of ratings were .96 for intelligence, .95 for academic intelligence, and .93 for everyday intelligence. Among the laypersons, the comparable respective correlations were .80, .86, and .72. Especially for the experts, then, there was a very high degree of relationship between rated importance of behaviors in defining an ideally intelligent person and rated characteristicness of behaviors in such a person. Such a correlation is not a foregone conclusion: Most people would agree, for example, that "eating" is highly characteristic of intelligent people, but few people would see eating as central to defining their conceptions of such people.

Third, the ratings of experts and laypersons for comparable kinds of intelligence are quite highly correlated, with all but one of six correlations ranging in the .80s. In each case (importance and characteristicness ratings), the correlation is highest for academic intelligence and lowest for everyday intelligence, but given the small range of correlations, probably the most prudent conclusion would be that experts and laypersons see things very much the same way, although not identically.

Structure and Content of People's Conceptions of Intelligence

Laypersons. Table 4 shows the results of a factor analysis of layperson's ratings of characteristicness of behaviors in an "ideally intelligent" person (Questionnaire 2). The factor analysis was done using correlation coefficients as input into a principal components analysis followed by varimax rotation of the factorial axes. Because of the unwieldiness of the original set of 170

intelligent behaviors as input to the final analysis, preliminary factor analyses were done in order to reduce the original set of 170 behaviors to a more tractable set of 98 behaviors that seemed to be the more central ones to people's conceptions of intelligence.

Insert Table 4 about here

Three strong and interpretable factors emerged from the analysis of ratings of the "ideally intelligent" person, accounting for 29%, 10%, and 7% of the variance in the data, for a total of 46%. These factors were labeled "practical problem-solving ability," "verbal ability," and "social competence." Behaviors with loadings of .60 and above on these factors are listed in the table. The first factor includes behaviors such as "reasons logically and well," "identifies connections among ideas," and "sees all aspects of a problem;" the second factor includes behaviors such as "speaks clearly and articulately," "is verbally fluent," and "converses well;" the third factor includes behaviors such as "accepts others for what they are," "admits mistakes," and "displays interest in the world at large." Although not every item loading highly on every factor fits precisely with the assigned label, the sense of each factor does seem consistent with its assigned label; and the behaviors with the strongest loadings were generally those most compatible with the labels.

Factor analyses were also conducted on the ratings of academic and every-day intelligence. For academic intelligence, three strong and interpretable factors emerged, accounting for 20%, 8%, and 7% of the variance in the data respectively, for a total of 35%. The factors were labeled "verbal ability," "problem-solving ability," and "social competence." Although the behaviors loading over .60 on these factors were of course not identical to those on the intelligence factors, they were highly similar. The problem-solving factor

seemed to have less of a practical orientation than did the analogous factor in the analysis of intelligence, so that the "practical" prefix was not placed in the label. For everyday intelligence, four strong and interpretable factors emerged, accounting for 26%, 10%, 8%, and 6% of the variance in the data respectively, for a total of 50%. These factors were labeled "practical problem-solving ability," "social competence," "character," and "interest in learning and culture."

Several points are worthy of note in these data. First, the factors for the three kinds of intelligence are highly overlapping, as would be expected from the simple correlations of the responses, but are not identical. Each set of factors shows a "slant" consistent with the kind of intelligence it underlies. Second, two kinds of factors cross-cut all three kinds of intelligence--problem-solving and social competence. The first kind of factor probably will come as no surprise to anyone, since problem-solving ability would seem to be part of almost anyone's notions about the nature of intelligence. The second kind of factor was something of a surprise, because social competence has played a relatively minor role in most theories of intelligence. Thorndike (1920) was among the first to propose that some kind of "social" intelligence could be separated from what he referred to as "abstract" and "concrete" intelligences, and social intelligence has played a role in the theorizing of Guilford (1967; Guilford & Hoepfner, 1971) and of Wechsler (1958); but most theorists of intelligence have ignored it, and indeed, a review of the literature by Keating (1978) concluded that factor-analytic studies had failed to demonstrate the existence of a social-intelligence factor. But, even if such a factor is largely missing from explicit theorizing, it is obviously a salient element of laypersons' implicit theorizing. Third, the first two (cognitive) factors constituting people's belief system for

intelligence seem closely to resemble the two principal factors in Cattell and Horn's theory of fluid and crystallized intelligence (Cattell, 1971; Horn, 1968). Fluid ability consists in large part of various kinds of problem-solving skills, whereas crystallized ability consists in large part of various kinds of verbal skills. Thus, the cognitive factors in people's implicit theories seem quite closely to correspond to the cognitive factors in one major explicit theory, that of Cattell and Horn.

Experts. Table 5 presents a factor analysis of experts' ratings of the characteristicness of behaviors in an "ideally intelligent" person. Because the behaviors that served as the input to the analysis were provided by laypersons rather than experts, only those behaviors were retained for the analysis that were rated by the experts as being important to their definitions of the ideally intelligent person, where an "important" behavior was defined as one in the top third of the 1 - 9 importance scale (rating of 6.33 and above).

Insert Table 5 about here

Three sizable and interpretable factors emerged in the experts' ratings of characteristicness of behaviors. The factors accounted for 23%, 19%, and 9% of the variance in the data respectively, for a total of 51%. The factors were labeled "verbal intelligence," "problem-solving ability," and "practical intelligence." The first factor included behaviors such as "displays a good vocabulary," "reads with high comprehension," and "displays curiosity;" the second factor included behaviors such as "able to apply knowledge to problems at hand," "makes good decisions," and "poses problems in an optimal way;" and the third factor included behaviors such as "sizes up situations well," "determines how to achieve goals," and "displays awareness to world around him or her."

Comparable factor analyses were performed for academic and everyday intelligence. For academic intelligence, three factors accounting for 26%, 12%, and 9% of the variance in the data were labeled "problem-solving ability," "verbal ability," and "motivation." This last factor was of particular interest, since it has not appeared in previously discussed analyses. Behaviors loading over .60 on this factor included "displays dedication and motivation in chosen pursuits" (.78), "gets involved in what he or she is doing" (.73), "studies hard" (.68), and "is persistent" (.64). For everyday intelligence, three factors accounting for 26%, 13%, and 16% of the variance in the data were labeled "practical problem-solving ability," "practical adaptive behavior," and "social competence."

Several points need to be made about the factors that emerged from these analyses. First, as was the case for laypersons, problem-solving ability is perceived as playing a major role in all three kinds of intelligence. Second, practical intelligence of some kind emerged in the factors for intelligence and everyday intelligence. Although these factors did not have as clear a "social" orientation as was seen in the factors of the laypersons, the experts, like the laypersons, perceived intelligence as comprising quite a bit more than is presumably measured by IQ tests. Third, a motivational factor emerged in the analysis of data for ratings regarding intelligence. Although behaviors indicating high motivation appeared as salient items in the data of the laypersons, they were distributed throughout the factors and in no case formed a factor of their own. Finally, the first two cognitive factors in the experts' conceptions of intelligence, like those in the laypersons' conceptions, seemed to correspond closely to fluid and crystallized abilities, whereas the third factor again seemed to represent some kind of practical or social adaptation. Thus, although there were differences

between the exact factor structures obtained for laypersons and experts, the structures faithfully mirrored the high correlations between the two sets of ratings in indicating remarkable similarities in perceptions between people who make at least part of their living studying intelligence and people who for the most part have no formal training in psychology, much less the specific field of intelligence.

Intercorrelations of Person Ratings and IQ Scores

As in the first experiment, we were interested in interrelations between people's ratings of themselves on intelligence, academic intelligence, and everyday intelligence. This experiment had three features that enabled us to go beyond the correlations in Experiment 1, however. The first was that since ratings were on a percentile scale rather than a 1-9 scale, there was at least a possibility of greater precision in the ratings. Second, since each layperson took an IQ test as well as making a self-rating, it was possible to compare self-ratings with "objective" measurements. Third, subjects in one group (Questionnaire 4) were asked to rate the other person they knew best as well as themselves, so that it was possible to compare one's self-ratings to one's ratings of another.

People's mean self-ratings on the percentile scale were 74 for intelligence, 71 for academic intelligence, and 74 for everyday intelligence. A percentile of 74 (for intelligence) corresponds to an IQ of 110 in the general population. In fact, the mean IQ of the subjects was 116, with a standard deviation of 18 and a range from 72 to 148.[1] Thus, people's ratings represented underestimates of their true abilities, relative to the general population against which they were asked to compare themselves. The mean ratings of others on the percentile scale were 76, 74, and 74 for intelligence, academic intelligence, and everyday intelligence respectively.

Intercorrelations of person ratings and IQ scores are presented in Table 6 for those subjects who received Questionnaire 4 (the questionnaire asking for behavioral characterizations of oneself and an other). Several aspects of these correlations are worthy of mention.

Insert Table 6 about here

First, correlations of self-rated intelligence and academic intelligence, on the one hand, and everyday intelligence, on the other, were about equal, as was the case for the railroad-station sample in Experiment 1. Also as was the case in Experiment 1, the correlation between academic and everyday intelligence was lower than either of the other two correlations (between intelligence, on the one hand, and academic and everyday intelligence, on the other). Second, the three kinds of self-rated intelligence were also significantly correlated with IQ: People's conceptions of themselves were related to their objective test performance. The highest correlation with IQ was that for rated academic intelligence. Third, intercorrelations between ratings of the other (for subjects receiving Questionnaire 4) were lower than intercorrelations between ratings of the self (for these same subjects). Apparently, subjects were less able to separate the three kinds of intelligence in themselves than in others, suggesting, perhaps, a halo effect in self-perception of various kinds of intelligence.

As in Experiment 1, a multiple correlation was computed between self-rated intelligence, on the one hand, and academic and everyday intelligence, on the other. The multiple correlation was .69 ($p < .001$), with regression coefficients for academic and everyday intelligence of .34 and .38. In this experiment, i

was also possible to regress IQ on the self-ratings of academic and everyday intelligence, as well as to regress one's rating of the other's intelligence on one's ratings of the other's academic and everyday intelligence. The multiple correlation of IQ with the two self-ratings was .38 ($p < .001$), with regression coefficients of .28 and .15 for academic and everyday intelligence. The multiple correlation of the other's rated intelligence with the two other-ratings was .48 ($p < .001$), with regression weights of .08 and .40 for academic and everyday intelligence. It is of some interest to note that the weights of academic and everyday intelligence in predicting self-rating were about equal, whereas these weights were very unbalanced (with the everyday weight much higher than the academic one) in predicting other-rating.

<u>Correlations of Factor Scores with IQ and Self-Ratings</u>

Factor scores were computed for those subjects who received Questionnaire 4, the questionnaire asking for behavioral characterizations of oneself and an other. The factor scores represented subjects' characterizations of their own behaviors on those items loading highly on each of the factors of each kind of intelligence, where the factors were those defined earlier. Factor scores were computed using an approximation technique whereby each item (behavior) loading .60 or over on a given factor was unit-weighted in the computation of the score; all other items (behaviors) were weighted zero. Table 7 shows simple and multiple correlations between subjects' factor scores on each of the three kinds of intelligence, on the one hand, and IQ and self-ratings, on the other.

Insert Table 7 about here

Prediction of IQ and of self-ratings of everyday intelligence were not

very successful. Only one (of ten) factor scores provided significant prediction in each case. Predictions of self-ratings of intelligence and of academic intelligence were successful, however. There were six (of ten) significant simple correlations in the prediction of self-rated intelligence, and four (of ten) significant correlations in the prediction of self-rated academic intelligence. All but one of these ten (six plus four) significant correlations were for "cognitive" factors such as practical problem-solving ability and verbal ability. Thus, people's ratings of the extent to which cognitive types of behaviors associated with intelligence and academic intelligence characterize themselves were related to these people's ratings of their own intelligence and academic intelligence. In some cases, it was possible to combine these clusters of self-ratings, as represented by factor scores, to yield rather good prediction of self-ratings via multiple regression. For example, the multiple correlation of self-rated intelligence with the three factor scores obtained for intelligence was .55 (as shown in the table).

Formation and Properties of "Prototypicality" Measures

Consider for Questionnaire 2--the questionnaire asking subjects to rate the characteristicness of each of a set of 250 behaviors in an "ideally intelligent, academically intelligent, and everyday intelligent person--the meaning of a mean response pattern averaged over subjects, whether these subjects be experts or laypersons. One might view a mean response pattern as representing an approximation to the population's prototype for what constitutes an ideally intelligent, academically intelligent, or everyday intelligent person. On the basis of the data collected in this study, it would be possible to form three such prototypes for experts (one for each type of intelligence) and three such prototypes for laypersons.

We did, in fact, form such prototypical response patterns, and, as we saw earlier, they were highly correlated between experts and laypersons.

Suppose one were to take each individual subject's response pattern for Questionnaire 4--the questionnaire asking subjects to rate the characteristicness of each of the 250 behaviors for his or her own behavior (as well as that of an other)--and correlate this individual response pattern with the prototypical response pattern (as obtained from different subjects filling out a different questionnaire, namely, Questionnaire 2). One might view the correlation between the individual's response pattern and the prototypical response pattern as measuring the degree to which a given subject resembles the prototype of an intelligent person. In effect, we have a "resemblance" measure of intelligence, based upon a comparison between individuals' self-descriptions and others' descriptions of an ideal: Higher scores represent closer resemblance between the individual and the prototype. We computed the correlations between the self-ratings and prototypes, basing the correlations only on the 170 behaviors that were intelligent (as opposed to unintelligent). In this way, we obtained measures of prototypicality for each subject receiving Questionnaire 4 on intelligence, academic intelligence, and everyday intelligence. In each case, we correlated the pertinent individual response pattern (for intelligence, academic intelligence, or everyday intelligence) with the corresponding prototypical response pattern.

Properties of the prototypicality measures are reported in Table 8. This particular set of correlations used the experts' prototypes as the basis for comparison. As would be expected from the high correlations between the data of the experts and the laypersons, practically identical results were obtained using correlations with the laypersons' prototypes. At the top of

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Insert Table 8 about here

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the table are the mean, standard deviation, and range of each of the three measures, where each measure is a correlation coefficient (computed for each individual subject) with a potential range from -1 to 1. These statistics show that the average correlation between the response pattern of each individual subject and of the prototypically intelligent person was significantly different from zero for each of the three kinds of intelligence. On the average, people saw themselves as having a moderate degree of resemblance to each of the prototypes. The range in degrees of resemblance was quite large, although, as is shown in the last column at the top, there were no individuals with nontrivially negative resemblances to the prototype. At the bottom of the table are correlations between the prototypicality measures and each of IQ and self-rated intelligence, academic intelligence, and everyday intelligence. The correlations between the prototypicality measure and IQ were both statistically significant and substantial for each of the three kinds of intelligence, with academic intelligence showing the greatest relationship and everyday intelligence the smallest relationship. These correlations, which are as high as or higher than correlations typically obtained between cognitive measures and psychometric tests (see, e.g., Hunt, Frost, & Lunneborg, 1973; Hunt, Lunneborg, & Lewis, 1975; Sternberg, 1977, 1980b), indicate that it is possible to obtain a rather good estimate of IQ on the basis of the correspondence between a person's self-perceived pattern of behaviors and the pattern of behaviors in an "ideal" person. Five of the six correlations with self-ratings of intelligence and academic intelligence were also statistically significant, although lower than the correlations with IQ, meaning that subject's self-descriptions better predicted their objectively measured intelligence than their subjectively rated intelligence. None of the correlations with everyday intelligence were significant. Here, as previously,

self-ratings of everyday intelligence prove to be harder to predict than self-ratings of academic and everyday intelligence.

Conclusions

To conclude, people do appear to have prototypes corresponding to different kinds of intelligence. These prototypes are very similar, but not identical, between experts and laypersons. The prototypes are organized into sensible factors of behavior, such as "practical problem solving ability," "verbal ability," and "social competence." One's self-perceived standing on the "cognitive" factors is predictive of one's self-ratings of intelligence and academic intelligence. Moreover, one's self-perceived correspondence to the prototypes for each of the three kinds of intelligence is predictive of one's IQ and of one's self-ratings of intelligence and academic intelligence. Self-ratings of academic and everyday intelligence are highly predictive of self-ratings of intelligence (overall), but ratings of an other's academic and everyday intelligence are less highly (although still significantly) related to ratings of that other's overall intelligence. It also appears that one is less able to dissociate various kinds of intelligence in oneself than in others. In sum, people do appear to have prototypes for an "ideally" intelligent person, and their self-perceived correspondences to these prototypes are associated with their estimates of their intelligence, as well as their measured intelligence. One question that still needs to be answered is whether people use these prototypes in informal, everyday evaluations of the intelligence of others. The third experiment was intended to address this question.

EXPERIMENT 3

In this experiment, we sought to ascertain the extent to which people actually use the behaviors associated with intelligence and unintelligence in their evaluations of other people's intelligence, in particular, when they are presented with written behavioral descriptions of others.

Method

Subjects

A questionnaire was sent to 168 persons selected at random from a New Haven area phone book. Of these persons, 65 responded in time for their data to be used in the study. Twelve persons responded too late for their data to be included in the study. All data were sent to us by return mail.

Materials

The principal experimental material was a 90-item questionnaire. Each item consisted of a verbal description of behaviors characterizing some particular person. People were told that they would "find brief descriptions of different people, listing various characteristics they have. Assume that the list for each person is made of characteristics that teachers have supplied to describe that person as accurately as possible." The subject's task was to "read the characteristics for each person and then to rate each person on how intelligent" the subject considered the person to be. Ratings were made on a 1 to 9 scale, where 1 was labeled on the scale as "not at all intelligent," 5 was labeled as "average intelligent," and 9 was labeled "extremely intelligent." Half of the items on the questionnaire presented unquantified behavioral descriptions (e.g., "She converses well") and half presented a mixture of quantified and unquantified descriptions (e.g., "She often converses well"). In fact, the items in the two halves of the questionnaire were identical except for the presence of quantification in one half of the items and its absence in the other half. Half of the descriptions

were paired with male names and half with female names. A given description was paired half the time with a male name and half the time with a female name (across subjects). Typical descriptions of people invented for Experiment 3 are shown in Table 9. Each item was chosen for the questionnaire so as to be representative of items loading highly (.60 or over) on one of the three factors of "intelligence" identified in Experiment 2, or of behaviors identified in Experiment 1 as unintelligent. (Academic and everyday intelligence were not dealt with in this experiment.) For example, one of the chosen behaviors, "keeps an open mind," was chosen because of its high loading (.73) on Factor I, Practical Problem-Solving Ability. Thirty-six different behaviors were used, including 24 positive ones (8 for each factor) and 12 negative ones. Each behavioral description could consist of from 4 to 8 statements. Most behavioral descriptions contained (randomly ordered) mixtures of intelligent and unintelligent behaviors, although some descriptions contained only one of these kinds of behaviors. The fictitious persons thus covered a range of levels of intelligence.

Insert Table 9 about here

Design

All subjects received the same questionnaire items. The various questionnaires differed from one another only in that (a) half of the subjects received quantified items presented before unquantified ones; the other subjects received the reverse ordering; (b) different pairings of names with descriptions of people were used for different subjects, with the constraint that a given description be paired half of the time with a male name and half of the time with a female name; and (c) different random orders of items were given to each subject, with the constraint that all quantified items and all unquantified items be blocked together.

Procedure

Subjects were told in a letter sent to their homes that they would receive $5 by return mail if they sent in the accompanying questionnaire anonymously and sent in a separate verification form indicating that they had, in fact, returned their questionnaire.

Results

Basic Statistics

The mean rating of intelligence over the 45 unquantified descriptions was 5.09 (on the 1-9 scale); the mean rating over the 45 quantified descriptions was 4.49. The difference between means was highly significant, $t(43) = 12.77$, $p < .001$, indicating that quantification generally lowered ratings of intelligence. Such a result would be expected, since quantification amounted to qualification of the statements that were made. The correlation between the unquantified statements and their paired quantified versions was .87, indicating that although quantification lowered ratings, it changed their pattern only slightly.

It made no difference in means whether a given description was paired with a male name or with a female name. The means in the unquantified condition were 4.49 for both male and female descriptions; the means in the quantified condition were 5.09 for male descriptions and 5.08 for female descriptions. Moreover, the correlation between identical descriptions paired for male versus female names was .99 in the unquantified condition and .98 in the quantified condition.

The reliabilities of the data were very high: Coefficient alpha for all random split halves of subjects was .91 for the ratings of unquantified descriptions and .92 for the ratings of quantified descriptions.

Modeling of Data

The main data of interest in this experiment were those deriving from linear modeling of the ratings of intelligence. Modeling was done both for unquantified and for quantified descriptions.

Unquantified descriptions. Two basic kinds of modeling were done. In the first, we took means and sums of characteristicness ratings from experts

and laypersons answering Questionnaire 2 from Experiment 2 (the questionnaire asking for ratings of how characteristic each behavior is of an ideally intelligent person), computing these means and sums on the basis of those behaviors listed in each description given in the present experiment. Sums were rescaled to have a theoretical mean of 0 (by subtracting 4 from each value). Thus, we obtained for each description a mean and rescaled sum of characteristicness ratings for the behaviors listed in that description, both for experts and laypersons. The correlation between ratings of intelligence and the mean characteristicness ratings for each fictitious person were .98 both for experts and for laypersons; the correlations between ratings of intelligence and rescaled summed characteristicness ratings for each fictitious person were .97 for experts and .96 for laypersons. Hence, regardless of whether expert or layperson data were used, the means and sums of the characteristicness ratings provided excellent prediction of people's overall evaluations of the intelligence of the fictitious persons who were described in the brief narrative passages. Length of description, incidentally, correlated only trivially with the evaluations.

In the second kind of modeling, multiple regression was used to predict the overall rating of the intelligence of the fictitious person from counts of the number of behaviors in each of the factors of intelligence (and the behaviors characterizing unintelligence) that were found in each passage. For example, if a given passage had one behavior listed from "practical problem-solving ability," two behaviors listed from "verbal ability," one behavior listed from "social competence," and two behaviors listed from the unintelligent behaviors, then the independent variables entered into the regression would have been 1, 2, 1, and 2 respectively. The multiple correlation between the ratings of the intelligence of the fictitious person, on the one hand, and the aspects of perceived intelligence and unintelligence, on the other, was .97. Regression weights were .32 for "practical probl-

solving ability," .33 for "verbal ability," .19 for "social competence," and -.48 for unintelligence. All weights were significant and all signs were in the predicted directions, with only the unintelligent behaviors showing a negative weight. The unintelligent behaviors had the highest regression weight, as might be expected, given that there was only one independent variable for such behaviors, as opposed to three for intelligent behaviors; moreover, as anyone who has read letters of recommendation knows, even one negative comment can carry quite a bit of weight. Of the three kinds of intelligent behaviors, the two cognitive kinds (practical problem-solving ability and verbal ability) carried about equal weight, and the noncognitive kind (social competence) carried less weight. These relative weightings were consistent with those obtained in Experiment 2 in the prediction of one's ratings of one's own intelligence: The cognitive factors were weighted more heavily than the noncognitive ones.

Quantified descriptions. These descriptions were modified by the adverbs "always," "often," "sometimes," and "never," or by no adverb at all. When a given description was of an intelligent behavior, a priori weights of 3, 2.5, 2, .5, and -2 were assigned to "always," no adverb, "often," "sometimes," and "never" respectively. When a given description was of an unintelligent behavior, a priori weights of -3, -2.5, -2, and -1 were assigned to "always," no adverb, "often," and "sometimes" respectively; the adverb "never" was not used to modify any unintelligent behaviors, because of the confusion that might be engendered in the case of double negatives (e.g., "He never fails to ask questions" seemed a bit confusing). The weights were chosen on the basis of an informal survey of colleagues rather than by parameter estimation in order to keep the number of parameters that needed to be estimated to a reasonable size.

The same two kinds of analyses were performed on the data for quantified descriptions as were performed on the data for unquantified descriptions. The unweighted independent variables described earlier for the unquantified descriptions were multiplied by the weights appropriate to them to yield new, weighted independent variables for the quantified descriptions. The correlation between ratings of intelligence and the mean characteristicness ratings for each fictitious person were .97 for experts and .96 for laypersons; the correlations between ratings of intelligence and rescaled summed characteristicness ratings for each fictitious person were .96 for both experts and laypersons. Hence, prediction for the quantified descriptions was comparable to that for the unquantified descriptions. Again, length of description was only trivially correlated with evaluations. The multiple correlation between the evaluations, on the one hand, and the three factors plus unintelligence, on the other, was .95. Regression weights were .37 for "practical problem-solving ability," .48 for "verbal ability," .20 for "social competence," and -.32 for unintelligence. Again, all weights were significant and in the expected direction. Also again, the weights for the cognitive factors were greater than the weight for the noncognitive one, although in this data set, the weight on the unintelligence variable was relatively lower than in the previous data set.

Conclusions

People use their implicit theories of intelligence in evaluating the intelligence of others as well as of themselves. Their evaluations of others, based on relatively brief behavioral descriptions of these others, can be predicted at a high level on the basis of their implicit theories. As in the self-ratings, people seem to weigh cognitive factors more heavily than noncognitive ones, and to take into account negative as well as positive

information. The implicit theories of experts and of laypersons are similar enough so that it makes little difference which is used in predictions: Results are almost identical for each. In sum, knowledge of a person's implicit theory can be used to predict that person's evaluations of both him or herself and others.

General Discussion

People have well-developed implicit theories of intelligence that they use both in self-evaluation and in the evaluation of others. Although there are differences in these theories across groups, there seems to be a common core that is found in the belief systems of individuals in all of the groups we studied. The common core includes some kind of problem-solving factor, some kind of verbal-ability factor, and some kind of social-competence factor.

A recent review of literatures covering different approaches to understanding intelligence, including the present one as well as the psychometric, information-processing, and mental-retardation approaches, concludes that these three aspects of intelligence, plus a motivational one (which did, in fact, appear as a factor in the experts' ratings of academic intelligence) seem to emerge from a variety of approaches to intelligence (Sternberg, in press).

Thus, the results of the present research seem to converge with research of other kinds in suggesting that intelligence is found to comprise certain kinds of behaviors almost without regard to the way in which it is studied. These behaviors include (among possible others) problem solving, verbal facility, social competence, and possibly motivation.

In particular, problem solving (or fluid ability) and verbal facility (or crystallized ability) seem to be integral aspects of intelligent functioning. These abilities can be identified by both correlational means (Cattell, 1971; Horn, 1968) and experimental means (Sternberg, 1980a,

1980c). In psychometric investigations, fluid ability is best measured by tests of abstract reasoning and problem solving, such as abstract analogies, classifications, series completions, and the like. Verbal items are also useful if their vocabulary level is kept low. Crystallized ability is best measured by tests that require for their performance the products of acculturation: vocabulary, reading comprehension, general information, and the like. In information-processing terms, crystallized ability seems best to separate the products of acquisition, retention, and transfer of verbal materials. These tests measure primarily outcomes of previously executed cognitive processes, rather than of current execution of these processes. The vocabulary that is measured by a vocabulary test, for example, may have been acquired years ago. Fluid ability tests, on the other hand, seem best to separate the execution of component processes of reasoning and problem solving. They measure primarily current rather than past performance.[2] In improving the functioning of mildly or moderately retarded individuals, it seems necessary to conduct training in both the acquisition, retention, and transfer skills that lead to the development of crystallized ability (e.g., Belmont & Butterfield, 1971; Campione & Brown, 1977) and in the reasoning and problem-solving skills that constitute fluid ability (e.g., Feuerstein, 1979). Motivational intervention may be needed, too (Zigler, 1971).

Implicit and explicit theories of intelligence are actually theories of different things. Implicit theories tell us about people's views of what intelligence is. They are theories of word usage, and in the case of "intelligence," the word is one of interest to a large number and variety of people. Explicit theories tell us (we hope) what intelligence is; in real life, it is more likely they tell us what some aspect of intelligence is. None of the currently available explicit theories seem to do justice to the

full scope of intelligence, broadly defined. Perhaps no one theory ever could, whether the theory is implicit or explicit. But theory-construction has to start somewhere, and in the course of scientific evolution, it seems that implicit theories of experts give rise to the explicit theories of these experts, which are in turn tested on objective behavioral data. Because of this developmental relationship between implicit and explicit theories, there is almost certainly going to be considerable overlap between them. We believe that a study of this overlap, as well of the overlap among theories of each of the two kinds, can inform and strengthen both kinds of theories and research. The kind of "prototypical analysis" performed here seems to be a useful complement to the kinds of "componential analysis" and other forms of analysis that have been conducted in laboratory analyses of intellectual functioning.

Reference Note

1. Cantor, N. Prototypicality and personality judgments. Unpublished doctoral dissertation, Department of Psychology, Stanford University, 1978.

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Footnotes

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[1] We were chagrined by the fact that our sample, which excluded students and was based upon responses of people who answered newspaper advertisements, had an average IQ one standard deviation above the general population mean. We, like others, have found it much easier to obtain specialized populations than to obtain the elusive "average" one.

[2] Various information-processing views on and approaches to fluid and crystallized abilities can be found in Carroll (1976), Pellegrino and Glaser (1980), Snow (1978), and Sternberg (1979). See also Resnick (1976) for a variety of contemporary views on the nature of intelligence.

Table 1

Correlations between Frequencies of Listed Behaviors

	Intelligence	Academic Intelligence	Everyday Intelligence
Library			
Intelligence	---	.24***	.12
Academic Intelligence		---	.24***
Everyday Intelligence			---
Railroad			
Intelligence	---	.10	.23***
Academic Intelligence		---	.14*
Everyday Intelligence			---
Supermarket			
Intelligence	---	.05	.30***
Academic Intelligence		---	.11
Everyday Intelligence			---
Overall			
Intelligence	---	.38***	.37***
Academic Intelligence		---	.32***
Everyday Intelligence			---

Note: Correlations are based on frequencies for the 170 intelligent behaviors.

*$p < .05$

**$p < .01$

***$p < .001$

Table 2

Correlations between Self-Ratings

	Intelligence	Academic Intelligence	Everyday Intelligence
Library			
Intelligence	---	.80***	.42***
Academic Intelligence		---	.28*
Everyday Intelligence			---
Railroad			
Intelligence	---	.73***	.74***
Academic Intelligence		---	.60***
Everyday Intelligence			---
Supermarket			
Intelligence	---	.83***	.65***
Academic Intelligence		---	.41***
Everyday Intelligence			---
Overall			
Intelligence	---	.80***	.60***
Academic Intelligence		---	.44***
Everyday Intelligence			---

Note: Correlations are based on self-ratings for 61 college library subjects, 63 train station subjects, and 62 supermarket subjects.

*$p < .05$
**$p < .01$
***$p < .001$

Table 3

Correlations within and between Ratings of Experts and Laypersons

		Experts 1 Int.	2 Ac.	3 Ev.	Laypersons 4 Int.	5 Ac.	6 Ev.
				Importance Ratings			
Experts	1 Intelligence	1.00	.90	.90	.80	.75	.54
	2 Academic Int.		1.00	.67	.69	.84	.28
	3 Everyday Int.			1.00	.73	.52	.72
Laypersons	4 Intelligence				1.00	.81	.76
	5 Academic Int.					1.00	.36
	6 Everyday Int.						1.00
				Characteristicness Ratings			
Experts	1 Intelligence	1.00	.83	.84	.82	.68	.69
	2 Academic Int.		1.00	.46	.72	.89	.43
	3 Everyday Int.			1.00	.69	.31	.81
Laypersons	4 Intelligence				1.00	.75	.86
	5 Academic Int.					1.00	.45
	6 Everyday Int.						1.00

Note: Correlations are based upon Questionnaire 1 (importance of behaviors in defining conception of ideally intelligent person) and Questionnaire 2 (characteristicness of behaviors in repertoire of ideally intelligent person). Correlations are between subject means on each questionnaire item. For example, Correlation 1-4 is between experts' and laypersons' questionnaire response patterns for the attribute, intelligence.

Table 4

Factors Underlying People's Conceptions of Intelligence:

Laypersons Rating Characteristicness of Behaviors in "Ideal" Person

	Factor Loading
I. Practical Problem-solving Ability	
1. Reasons logically and well	.77
2. Identifies connections among ideas	.77
3. Sees all aspects of a problem	.76
4. Keeps an open mind	.73
5. Responds thoughtfully to others' ideas	.70
6. Sizes up situations well	.69
7. Gets to the heart of problems	.69
8. Interprets information accurately	.66
9. Makes good decisions	.65
10. Goes to original sources for basic information	.64
11. Poses problems in an optimal way	.62
12. Is a good source of ideas	.62
13. Perceives implied assumptions and conclusions	.62
14. Listens to all sides of an argument	.61
15. Deals with problems resourcefully	.61
II. Verbal Ability	
1. Speaks clearly and articulately	.83
2. Is verbally fluent	.82
3. Converses well	.76
4. Is knowledgeable about a particular field of knowledge	.74
5. Studies hard	.70
6. Reads with high comprehension	.70
7. Reads widely	.69
8. Deals effectively with people	.68
9. Writes without difficulty	.65
10. Sets aside time for reading	.64
11. Displays a good vocabulary	.61
12. Accepts social norms	.61
13. Tries new things	.60

Table 4 (Contd.)

		Factor Loading
III.	Social Competence	
1.	Accepts others for what they are	.88
2.	Admits mistakes	.74
3.	Displays interest in the world at large	.72
4.	Is on time for appointments	.71
5.	Has social conscience	.70
6.	Thinks before speaking and doing	.70
7.	Displays curiosity	.68
8.	Does not make snap judgments	.68
9.	Makes fair judgments	.66
10.	Assesses well the relevance of information to a problem at hand	.66
11.	Is sensitive to other people's needs and desires	.65
12.	Is frank and honest with self and others	.64
13.	Displays interest in the immediate environment	.64

Table 5

Factors Underlying People's Conceptions of Intelligence:

Experts Rating Characteristicness of "Important" Behaviors in "Ideal" Person

	Factor Loading
I. Verbal Intelligence	
1. Displays a good vocabulary	.74
2. Reads with high comprehension	.74
3. Displays curiosity	.68
4. Is intellectually curious	.66
5. Sees all aspects of a problem	.66
6. Learns rapidly	.65
7. Appreciates knowledge for its own sake	.65
8. Is verbally fluent	.65
9. Listens to all sides of an argument before deciding	.64
10. Displays alertness	.64
11. Thinks deeply	.64
12. Shows creativity	.64
13. Converses easily on a variety of subjects	.64
14. Reads widely	.63
15. Likes to read	.62
16. Identifies connections among ideas	.60
II. Problem-solving Ability	
1. Able to apply knowledge to problems at hand	.74
2. Makes good decisions	.73
3. Poses problems in an optimal way	.73
4. Displays common sense	.66
5. Displays objectivity	.66
6. Solves problems well	.66
7. Plans ahead	.64
8. Has good intuitions	.62
9. Gets to the heart of problems	.62
10. Appreciates truth	.61
11. Considers the end result of actions	.61
12. Approaches problems thoughtfully	.60

Table 5 (Contd.)

		Factor Loading
III.	Practical Intelligence	
	1. Sizes up situations well	.84
	2. Determines how to achieve goals	.83
	3. Displays awareness to world around him or her	.69
	4. Displays interest in the world at large	.63

Table 6

Intercorrelations of Person Ratings and IQ Scores

Self

	Int.	Ac. Int.	Ev. Int.	IQ
Rated Intelligence	1.00	.60***	.62***	.23*
Rated Academic Intelligence		1.00	.54***	.36***
Rated Everyday Intelligence			1.00	.30**
IQ				1.00

Other

	Int.	Ac. Int.	Ev. Int.
Rated Intelligence	1.00	.25*	.48***
Rated Academic Intelligence		1.00	.39***
Rated Everyday Intelligence			1.00

*$p < .05$

**$p < .01$

***$p < .001$

Table 7

Correlations of Factor Scores with IQ and Self-Ratings

	IQ	Self-Ratings Intelligence	Ac. Intel.	Ev. Intel.
Intelligence				
I. Practical problem-solving ability	.16	.44**	.31	.19
II. Verbal ability	.23	.41*	.35*	.27
III. Social competence	.14	.16	.21	.07
Multiple Correlation	.24	.55*	.38	.30
Academic Intelligence				
I. Verbal ability	.29	.38*	.36*	.22
II. Problem-solving ability	.01	.49**	.37*	.36*
III. Social competence	.03	.09	-.06	.02
Multiple Correlation	.33	.53*	.50*	.39
Everyday Intelligence				
I. Practical problem-solving ability	.11	.48**	.34*	.26
II. Social competence	.08	.37*	.28	.20
III. Character	.10	.18	.28	.05
IV. Interest in learning and culture	.52***	.31	.20	.30
Multiple Correlation	.57*	.57*	.35	.43

*$p < .05$
**$p < .01$
***$p < .001$

Table 8

Properties of Prototypicality Measures

Basic Statistics

Measure	Mean	Standard Deviation	Range
Intelligence	.40***	.20	-.05 - .65
Academic Intelligence	.31***	.19	-.08 - .56
Everyday Intelligence	.41***	.18	-.02 - .64

Correlations

		Self-Ratings		
Measure	IQ	Intelligence	Ac. Int.	Ev. Int.
Intelligence	.52**	.36*	.40*	.24
Academic Intelligence	.56***	.40*	.42*	.31
Everyday Intelligence	.45**	.32	.34*	.17

Note: Prototypicality measure computed as correlation between subject's characterization of his or her own behaviors and "prototypical" expert's characterization of "ideal" person's behaviors.

*$p < .05$

**$p < .01$

***$p < .001$

Table 9

Typical Descriptions of People Used in Experiment 3

Unquantified

Susan:

She keeps an open mind.

She is knowledgeable about a particular field of knowledge.

She converses well.

She shows a lack of independence.

She is on time for appointments.

Adam:

He deals effectively with people.

He thinks he knows everything.

He shows a lack of independence.

He lacks interest in solving problems.

He speaks clearly and articulately.

He fails to ask questions.

He is on time for appointments.

Quantified

Alice:

She sometimes shows a lack of independence.

She often reads widely.

She is never verbally fluent.

She often is on time for appointments.

She has a social conscience.

She often reasons logically and well.

She sometimes lacks an understanding of the nature of things.

Bob:

He often displays interest in the world at large.

He often has a social conscience.

He sometimes admits mistakes.

He always fears the unfamiliar.

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